UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF INFORMATION
PRESS SERVICE

Picture Story No. 44
Release - November 30, 1947

RADIOACTIVE TAGS SHOW HOW PLANT GROWTH REGULATORS ACT

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Atomic energy scientists have given agricultural scientists a handy tool for research now under way in the U. S. Department of Agriculture on the whys and wherefores of the chemicals that regulate plant growth. Research on plant growth regulators already has made available to farmers chemicals that kill weeds and others that make fruit stick to the tree till fully ripe. The Department investigators, however, feel that they have barely scratched the surface in this line of research. They want to find more substances that regulate plant growth, as well as more effective ways of using those already developed. To this end they are trying to discover just how certain chemicals affect the growth and condition of different tissues in the stems, leaves, and fruits of many plants. By tagging these chemicals with a radioactive substance, they can observe the rate at which an experimental plant growth regulator penetrates the plant and can trace its movements into the stem, leaves, and fruit.

Chemists at the Agricultural Research Center, Beltsville, Md., have devised special equipment and special methods for synthesizing a radioactively tagged plant growth regulator. Starting with a radioactive iodine solution from the U. S. Atomic Energy Commission at Oak Ridge, Tenn., they prepare 2-iodo^{131}-3-nitrobenzoic acid, or "INBA" for short. The plant scientists apply INBA, in minute measured quantities, to growing plants and at stated times take samples from the treated plants. Analyses of these samples show how much of the material under test has moved out to different parts of the plant.

Applied to the leaf of a young bean plant, these tests show, INBA moves through the plant and concentrates in buds and in partly expanded leaves at the growing point, severely checking later growth. Applied to a leaf of a young barley plant, it likewise moves into the young leaves, but apparently in much smaller concentrations, so that it does not injure the plant appreciably.

These pictures show how the chemists and plant physiologists of the U. S. Department of Agriculture cooperate in research designed to provide basic facts for the further development of plant growth regulators.

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(EDITORS AND WRITERS: You may obtain 8x10 glossy prints of any of the pictures here shown free on request to the Press Service, Office of Information, U. S. Department of Agriculture, Washington 25, D.C.)

(1) Wearing rubber gloves, using long-handled tools, and working behind a heavy lead shield, to minimize exposure to harmful beta and gamma radiations, Chemists John W. Wood (left) and George W. Irving, jr., transfer to the all-glass synthesizing apparatus a small amount of radioactive iodine solution from a bottle shipped in a heavy lead container from the U. S. Atomic Energy Commission, Oak Ridge, Tenn.

(2) A semi-micro glass apparatus is used for the synthesis of the radioactively tagged plant growth regulator.

(3) Chemist Wood purifies the radioactively tagged plant growth regulator, which will then be mixed with lanolin and turned over to

(4 and 5) Dr. John W. Mitchell, plant physiologist, who applies it, in a minute amount, to the tip of a bean leaf

(6) The radioactive material is absorbed by the leaf and moves along to other parts of the plant, from which sections are taken at the end of 3 days.

(7) Dr. Mitchell takes sections from different parts of different plants that have been treated with the radioactive material

(8) Mr. Wood grinds them for analysis. His assistant, Mrs. Janet Poole, monitors the laboratory bench top for possible excessive radiation.

(9 and 10) Each ground sample of plant material treated with the radioactively tagged plant growth regulator, in a metal cup, is placed in a counting chamber

(11) Where its radioactivity is measured.